New frontiers of managerial training: the LiVES project

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Abstract The evolution of the Internet allowed the Web to become, among the different media, the most global, interactive and dynamic medium to share information. Therefore, in the last decades, e-Learning has been widely used not only in the academic community, but also in the business sector. Within this context, thanks to their own competences, people can develop specific characteristics which may provide a competitive advantage for their organizations. The development and use of new technologies for the creation of three-dimensional (3D) Virtual Worlds set new challenges and enlarge the very idea of 'learning environment'. This paper aims at investigating the characteristics of training activities directed at the managerial class, in such a way as to increase their efficacy; it also analyses how the use of specific innovative technologies may be an effective solution.

Introduction

The evolution of the Internet allowed the Web to become, among the different media, the most global, interactive and dynamic medium to share information. Therefore, in the last decades, e-Learning has been widely used not only in the academic community, but also in the corporate environment [1,2]. E-Learning allows to distribute course-related contents through any means of communication [3], directly via the Internet or, more specifically, via an intranet, as well as via satellite transmission, interactive TV or audio/video media (tape, CD-Rom) [4]. Moreover, in literature, e-Learning is often called in different ways, such as: Web-Based Learning (WBL), Internet-Based Training (IBT), Advanced Distributed Learning (ADL), Web-Based Instruction (WBI), Online Learning (OL) and Open/Flexible Learning (OFL)[5].

E-Learning introduces a new learning method, which is different from the traditional paradigm of the "Bucket Theory". According to this theory, the mind of the learner is a "passive container", inside which the lecturer de-

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posits part of his knowledge, as its sole owner [6]. Indeed, e-Learning is able to change teaching, by changing communication into a team work, an activity based on peer interaction and cooperation. The lecturer is no longer the key actor, and a new community is developed, which includes lecturers, tutors and learners, acting as a "Knowledge Building Community"[7,8,9,10].

Within the business/administration sector, thanks to their own competences, people can develop specific characteristics which may provide a competitive advantage for their organizations. Updating competences and transferring them to other members of the same organization might be the starting point [11]. Corporate managers can guarantee business success only by developing and fostering core competences [12], i.e., those characteristics which enhance performance, taking it to a higher level [13].

The real source of competitive advantage lies in the ability of the management to consolidate technologies and productive capacity into competences that allow each business to quickly adapt to the changing market opportunities [14]. Indeed, the competence is a specific characteristic of an individual; it is connected to an effective or superior performance within a specific task. It can be measured on the basis of pre-established criteria [13]. Therefore, training can refer to a deep and global activity which produces an intellectual, physical and moral change within the individual. Training can be an effective tool in the pursuit and develop of such competences [15]. Some authors think that e-Learning is a suitable answer to corporate needs, and to managers needs in particular, in order to manage competence update and transfer [16].

This paper aims at investigating which characteristics managerial training shall have, in order to increase its efficacy; it also analyses how the use of specific innovative technologies may be an effective solution. These are the staring points for the definition of "meta-requirements", in compliance with the Design Research model of Walls et al. [17]. The next paragraph provides a taxonomy of e-Learning models, as well as a description of the changes produced in this field by technological innovation. According to Walls et al., these contents will contribute to the definition of the so called "Kernel Theories".

Moreover, a research project will be described: the LiVES (Learning in Virtual Extended Space) project, which aims at creating a technologically innovative environment, based on 3D virtual reality, in which providing training courses for the managerial class. This project will be taken as a case to use in the design research process.

E-Learning and its models

Generally speaking, learning is made up of models and strategies [18] which include the characteristics of how the learner builds the meaning of the concepts put forward [19]. With reference to e-Learning, the three main model, with their different learning characteristics and methods, are described below [20]:

- OPEN or FLEXIBLE LEARNING: This approach describes distance learning; emphasis moves from the curriculum to the learner's needs, by creating an immediate and available learning environment (here and now) [21]. It is a "student-centered" model, focusing on learning rather than teaching.
- DISTRIBUTED LEARNING: This approach is based on the possibility to supply training at any time, everywhere and in different places, combining also different technologies [22]. Within this contest, learners can complete courses and study programs at home or at the workplace, by communicating with lecturers and with colleagues via e-mail, forum, videoconference and other IT-based forms of communication.
- LEARNING COMMUNITIES: A learning community is a group of people supporting other people in their learning activities, by working together on projects, learning from each other, through a collective social-cultural experience, where participation leads to learn new concepts [23][24]. Learning communities provide the opportunity to make experiences on interdisciplinary topics, by promoting connections among students, between students and lecturers and among the different subjects [25]. Learning communities are informal learning environments, where emphasis shifts from teaching to learning.

The term "learning community" includes any social network which unites people in order to share knowledge; for this reason, it is better to talk about "Communities Of Practice" Or "Knowledge Building Communities" [20], here described:

- COMMUNITIES OF PRACTICE: Groups of people who are informally united by sharing experiences and passion for a common task [26]. Such communities are common in the business/administration sector, where knowledge is seen as an intellectual capital [27].
- KNOWLEDGE BUILDING COMMUNITIES: Learning communities where communication is perceived as a transformation (meaning a new learning experience) through knowledge sharing and building. Participants share a common goal to build and share knowledge through activities, projects and discussions, where the lecturer/tutor is an active participant [28].

The following picture describes the above mentioned three models, highlighting the different characteristics and their correlation [29].

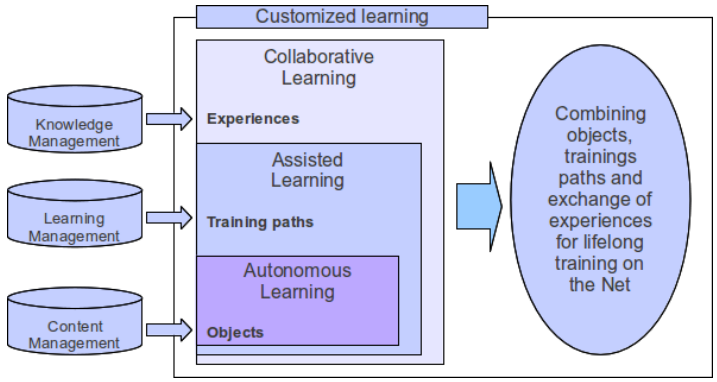

Fig. 1. E-Learning models (based on Salis et al. 2002)

Collaborative learning in the 3D Virtual World

In the last years, technological innovation contributed to the creation of new methods of interaction, affecting not only education, but also setting new challenges and enlarging the very idea of "learning environment" [30]. In particular, the development and use of technologies that allow the creation of 3D virtual words is extremely important. These can be defined as a set of nodes (PC desktops) connected in a network, where users move and interact in a 3D environment [30]. Within the 3D environment, users are represented by an avatar, thanks to which they can interact with other avatars (users) and with the environment. The most popular 3D platform are: Active Worlds, OnLive! Traveler, Adobe Atmosphere, OpenSim, and the perhaps better known SecondLife. Each of them has three different functions: an interactive 3D environment, the use of avatars for representing users and an interactive chat-room to allow users to communicate among each other.

Even if 3D virtual words are still in evolution, they provide communication opportunities supported by text-based/chat-based applications, such as Multiple User Domains (MUD) Object Oriented (MUD Object Oriented, MOO). Usually, these latter support constructive learning, and allow the development of Knowledge Building Communities [31] by promoting interactive learning, cooperation and commitment opportunities in space and time, both within and among classes [32].

According to Monahan [33], 3D virtual worlds show the shift from "text-based online learning environment" to "immersive platforms". Unlike MOOs, they provide 3D visual representations of space and allow learners to interact with information from their own angle, supporting learning activities based on constructivism [34,35,36]. Indeed, Winn [37] thinks that, during a traditional course, information is often provided like a "third person symbolic experience". On the contrary, the most effective way to learn is through a direct experience. According to Winn [37], 3D virtual reality can contribute to fill the gap between experiential learning and the symbolic representation of information.

Innovative methods of managerial training: LiVES project

On the basis of the above sections, the following three remarks can be obtained:

1. Updating and transferring managerial competences can lead to a competitive advantage for the organization;
2. E-learning seems to be the method that best meets training needs of managers and of those working in the business and administration sector;
3. The experience within 3D virtual words allows a more effective learning since it is based on direct experience.

On the basis of these assumptions, the requirements of the LiVES research project were defined. LiVES (Learning in Virtual Extended Spaces) studies the potential and the implementation methods of 3D platforms within lifelong vocational training. This project aims at defining, creating, integrating and experimenting an innovative platform based on an interactive virtual class, where professionals and/or students can discuss, share experiences, and train. In particular, the system that will be created shall meet the following requirements:

- Allowing students and professionals to actively take part to training activities in a more natural, effective and pleasant way;
- Stimulate social interaction through an interactive information/communication flow among users in real time, even when users are in different places;
- Improving the approach to problem-solving through innovative tests which are able to make learning experiences similar to real practice, as much as possible;

- Supporting, protecting, respecting and stimulating the specific potential of every person, such as originality and creativity in the professional practice through three-dimensional graphics and interactive objects;
- Enlarging access to lifelong training also to professionals with less mobility (e.g., disabled people).

On the basis of the above requirements, the main activities involved in platform creation and integration will be the following:

- Selecting a suitable 3D platform for the training activities of the project. The selection criteria will be the following, but not limited to: availability, diffusion, usability, use in documented training activities, easy management.
- Creating virtual environments within the selected platform, where training activities shall take place. Specific areas for students and tutors will be created, as well as common areas for free discussions. This virtual environments shall be a reference for similar future training activities.
- Creation of software tools useful for training activities. Activities shall be supported by avatars and especially provided software tools.

The platform will be experimented during training activities for managers working in the IT sector, in order to minimize problems connected to the interaction with innovative technologies. In this way, the platform will be provided with a special environment where specific training problems may be analyzed and a participating approach will be guaranteed, aiming at the platform development.

Conclusions and future research steps

Following one of the models available in the design research, this paper analyzes the problem of managerial training and how innovative forms of e-Learning may support an effective training activity. On the basis of the literature review (Kernel Theories), the meta-requirements for a suitable learning environment for managerial training were defined. This led to the proposal of a research project which includes, among its goals, the creation of a 3D platform to support training within this sector.

The limitation of this paper is that the LiVES project is still underway, therefore, no empirical study was carried out on the problems that might emerge in the phases after requirement identification. However, this provides us the opportunity to further develop this research, on the basis of the evolution of the project phases.

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